

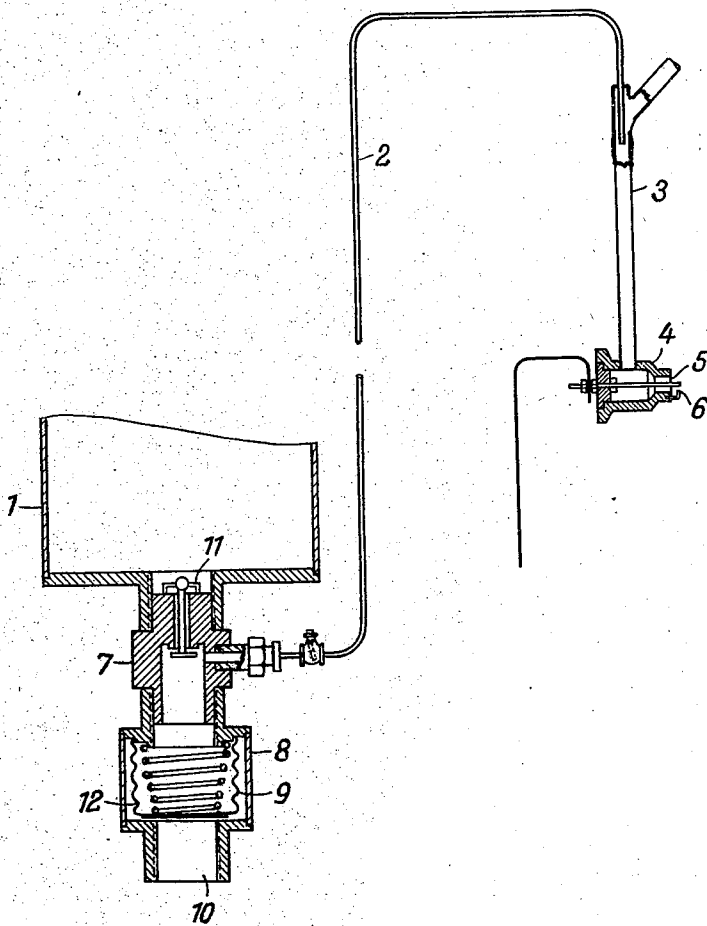
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IGNITING MEANS FOR FUEL-AIR BURNERS

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IGNITING MEANS FOR FUEL-AIR BURNERS

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The present invention relates to a device for igniting a mixture of air and fuel when it leaves a burner. Igniting devices are already known in which a measured quantity of burner oil is automatically atomized when the burner is switched on, and is then fed to an electrical igniting device whereupon the igniting flame which is thus obtained ignites the air-fuel mixture issuing from the burner. Such ignition devices do not, however, always provide immediate ignition, especially if the associated burner consumes heavy oil having a high ignition point. If ignition does not occur immediately an unburned air-fuel mixture will escape for some time from the burner into, for instance, the associated boiler so that an explosive mixture is likely to be produced therein, the subsequent ignition of which might cause fatal accidents.

The new igniting device is adapted to avoid the disadvantage mentioned by the provision of a pump-like mechanism which is actuated by the pressure either of the oil or of the atomizing medium for the oil or of the combustion air, said mechanism forcing a measured amount of readily inflammable igniting oil, which is contained in a reservoir, into a jet of air. The easily inflammable gas mixture created thereby is now ignited electrically and the flame which is thus obtained serves for lighting the mixture composed of heavy oil and air which is leaving the burner. The said pump-like mechanism preferably consists of a single-acting diaphragm pump, the diaphragm of which is compressed when the burner is set into operation, so that a portion of the igniting oil contained inside the pump is forced through the igniting oil pipe to the ignition device. When the burner ceases to operate the pressure decreases whereupon the suction chamber of the pump expands under the action of a spring and is filled afresh with igniting oil which is drawn in through a valve from a reservoir.

It is essential for a satisfactory operation of the device that the diaphragm pump be always completely filled with igniting oil when the burner comes into operation. Since the pump must be located quite near to the boiler which is to be heated, because otherwise the resistance in the piping would be too great, a complete filling of the suction chamber of the pump may often not be obtained due to a partial vaporisation of the igniting oil within the pump under the influence of the heat radiated from the boiler. In such a case a part of the suction chamber of the pump is filled with oil vapours instead of igniting oil

so that at the moment of operation of the heating plant no igniting oil at all or only an insufficient amount thereof is forced into the ignition device. According to the invention this disadvantage is met by arranging the reservoir immediately vertically above the pump and by connecting it to the latter through a non-return valve which closes only when the pump is performing its working stroke, whilst it is open when the diaphragm pump is deflated. The vapours created in the pump through the radiation of heat from the boiler and also air bubbles, particles of dirt, etc., are now free to rise through the open non-return valve into the reservoir for the igniting oil whilst a corresponding quantity of the latter flows down into the suction chamber of the pump. Thus the pump is always completely filled with igniting oil. Other drawbacks are avoided by dispensing with suction pipes and long syphoning feed channels connecting the igniting oil reservoir with the pump, or the pump with the electric ignition apparatus.

Further variations and developments of the invention will be apparent from the following description of an example illustrated in the drawing.

The igniting oil is fed from the reservoir 1 through the pump-like mechanism, more fully described hereinafter, into the igniting oil pipe 2 and from thence into the tube 3. From this tube it is blown into a hollow ignition plug by means of a laterally entering air jet. The mixture composed of air and igniting oil leaves the plug by the opening 5 and is ignited at that point by the electrodes 6 before entering the boiler chamber.

The pump-like mechanism, which is intended to feed measured amounts of igniting oil, comprises a valve housing 7 which is connected both with the igniting oil reservoir 1 and with the housing 8 of the pump. The housing of the pump is divided by a diaphragm 9 into two parts. The part comprised between the diaphragm and the housing of the pump is connected with the oil piping or with the atomizing air pipe or with the combustion air pipe by a tube which is attached at 10. Inside the body of the diaphragm and the valve housing igniting oil is contained which flows down from the igniting oil reservoir 1, arranged vertically above the pump, through the non-return valve 11 into the suction chamber of the pump.

When the burner is put into operation, the diaphragm 9 is compressed against the action of the spring 12 due to the pressure which is exerted

through the pipe 10 by the oil or by the atomizing air or by the combustion air. The non-return valve 11 is thus closed and a portion of the igniting oil which is available in the diaphragm body and the valve housing 7 is forced through the igniting oil pipe 2 to the ignition device.

When the burner ceases to operate the pressure exerted through the pipe 10 decreases. The diaphragm expands under the action of the spring 12 and opens the non-return valve 11 so that fresh igniting oil may flow into the diaphragm body and the valve housing through valve 11. The igniting oil is prevented from being drawn back from the oil pipe 2 by the provision of a valve that is arranged within said pipe. Instead of inserting a valve specifically for this purpose, the diameter of the said igniting oil pipe may be made so small that a flow-back of the igniting oil contained in the said oil pipe cannot take place because of the great resistance thereto. An unhindered escape in the upward direction of the vapours created within the pump and a replacement thereof by fresh igniting oil flowing down from the reservoir is assured by the fact that the igniting oil reservoir is arranged vertically above the pump and that the said two devices are connected with each other by a non-return valve or by some other closing means which closes only while the diaphragm 9 is carrying out its working stroke. Also, air bubbles which may enter the interior of the pump, and particles of dirt, find their way in an upward direction passing the valve 11 into the reservoir of the igniting oil. On the other hand by the arrangement of the reservoir on a level lower than that of the ignition device the flowing away and waste of igniting oil is prevented which otherwise might occur in case of a breakdown or disorder of the associated plant.

The present invention may be varied and altered in many ways still within the scope of the invention as set forth in the appended claims. For instance the new igniting device may obviously be used also for lighting other kinds of burners, e. g., burners for pulverised coal, instead of using it for heavy oil burners.

What I claim and desire to secure by Letters Patent of the United States is:

1. In an igniting means of the character described, an ignition device, means for supplying igniting fuel to said device, said means comprising a spring loaded diaphragm pump, a valve housing in communication with and located directly above said pump, an igniting oil pipe from said valve housing below the top thereof to said ignition device and constantly in communication at its entrant end with said valve housing, a non-return valve located in said valve housing above the place where said pipe is connected to the housing, an ignition fuel reservoir located directly above said valve housing and communicating with the same via said non-return valve, means to apply force to said diaphragm pump in opposition to that of its spring to force ignition fluid from said valve chamber into and through said igniting oil pipe, said igniting oil pipe having means to prevent return flow of igniting oil into said valve housing, by virtue of all of which any vapors in the diaphragm pump and in the valve housing will, upon the opening of said valve, pass into said reservoir thereby preventing such vapors being forced into said igniting oil pipe.

2. In an igniting means of the character described, an ignition device, means for supplying

igniting fuel to said device, said means comprising a spring loaded diaphragm pump, a valve housing in communication with and located directly above said pump, an igniting oil pipe from said valve housing below the top thereof to said ignition device and constantly in communication at its entrant end with said valve housing, a non-return valve located in said valve housing above the place where said pipe is connected to the housing, an ignition fuel reservoir located directly above said valve housing and communicating with the same via said non-return valve, means to apply force to said diaphragm pump in opposition to that of its spring to force ignition fluid from said valve chamber into and through said igniting oil pipe, said igniting oil pipe having means to prevent return flow of igniting oil into said valve housing, by virtue of all of which any vapors in the diaphragm pump and in the valve housing will, upon the opening of said valve, pass into said reservoir thereby preventing such vapors being forced into said igniting oil pipe, the arrangement of the pump, the valve housing and the reservoir being such that the escape of vapor from the pump and valve housing into the reservoir and the flow of oil from the reservoir into the valve housing and the pump take place in a vertical direction.

3. In an igniting means of the character described, an ignition device, means for supplying igniting fuel to said device, said means comprising a spring loaded diaphragm pump, a valve housing in communication with and located directly above said pump, an igniting oil pipe from said valve housing below the top thereof to said ignition device and constantly in communication at its entrant end with said valve housing, a non-return valve located in said valve housing above the place where said pipe is connected to the housing, an ignition fuel reservoir located directly above said valve housing and communicating with the same via said non-return valve, means to apply force to said diaphragm pump in opposition to that of its spring to force ignition fluid from said valve chamber into and through said igniting oil pipe, said igniting oil pipe having means to prevent return flow of igniting oil into said valve housing, by virtue of all of which any vapors in the diaphragm pump and in the valve housing will, upon the opening of said valve, pass into said reservoir thereby preventing such vapors being forced into said igniting oil pipe, said igniting oil pipe communicating with the substantially highest part of the valve housing below the non-return valve and communicating with the ignition device at substantially its highest place, and said ignition device being located at a higher level than said pump and reservoir.

4. In an igniting means of the character described, an ignition device, means for supplying igniting fuel to said device, said means comprising a spring loaded diaphragm pump, a valve housing in communication with and located directly above said pump, an igniting oil pipe from said valve housing below the top thereof to said ignition device and constantly in communication at its entrant end with said valve housing, a non-return valve located in said valve housing above the place where said pipe is connected to the housing, an ignition fuel reservoir located directly above said valve housing and communicating with the same via said non-return valve, means to apply force to said diaphragm pump in opposition to that of its spring to force ignition fluid from said valve chamber into and through

said igniting oil pipe, said igniting oil pipe having means to prevent return flow of igniting oil into said valve housing, by virtue of all of which any vapors in the diaphragm pump and in the valve housing will, upon the opening of said valve, pass into said reservoir thereby preventing such vapors being forced into said igniting oil pipe, the arrangement of the pump, the valve housing and the reservoir being such that the escape of vapor from the pump and valve housing into the

reservoir and the flow of oil from the reservoir into the valve housing and the pump take place in a vertical direction, said igniting oil pipe communicating with the substantially highest part of the valve housing below the non-return valve and communicating with the ignition device at substantially its highest place, and said ignition device being located at a higher level than said pump and reservoir.

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